

Scope of the Patent Claims

1. An ion beam device comprising:

liquid metal ion beam irradiation means for irradiating a specific portion of a sample with a prescribed liquid metal ion beam so as to form a cross section; and

gaseous ion beam irradiation means for scanning a prescribed region of the cross section using a gaseous ion beam focused to a prescribed diameter and removing a damaged layer on the prescribed region.

2. The ion beam device as disclosed in claim 1, wherein a size of a beam spot of the gaseous ion beam on the cross section is smaller than the size of the cross section.

3. The ion beam device as disclosed in claim 1, wherein a size of a beam spot of the gaseous ion beam on the cross section is smaller than the size of the prescribed region.

4. The ion beam device as disclosed in any one of claims 1 to 3, wherein the gaseous ion beam irradiation means is configured in such a manner that the gaseous ion beam is incident in either a substantially perpendicular manner or at an incline with respect to the cross section.

5. The ion beam device as disclosed in any one of claims 1 to 4, wherein the gaseous ion beam is an inert gas ion beam.

6. The ion beam device as disclosed in any one of claims 1 to 5, further comprising electron microscope means for scanning the prescribed region using an electron beam and forming a transmitted electron image or secondary electron image for the prescribed region.

7. An ion beam processing method comprising:

a first step of irradiating a specific portion of a sample with a prescribed liquid metal ion beam so as to form a cross section; and

a second step of scanning a prescribed region of the cross section using a gaseous ion beam focused to a prescribed diameter and removing a damaged layer on the prescribed region.

8. The ion beam processing method as disclosed in claim 7, wherein the second step contains a step of changing the angle of incidence of the gaseous ion beam to the cross section so as to eliminate a damaged layer.

9. The ion beam processing method as disclosed in claim 7 or claim 8, wherein the first step contains a step of changing angle of irradiation of the prescribed liquid metal ion beam so as to form a cross section.

10. The ion beam processing method as disclosed in any one of claims 1 to 9, wherein a size of a beam spot of the gaseous ion beam on the cross section is smaller than the size

of the cross section.

11. The ion beam processing method as disclosed in any one of claims 1 to 9, wherein a size of a beam spot of the gaseous ion beam on the cross section is smaller than the size of the prescribed region.

12. The ion beam processing method as disclosed in any one of claims 7 to 11, wherein the gaseous ion beam is an inert gas ion beam.